

# **Unconsolidated Aquifer Systems of Jackson County, Indiana**

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Six unconsolidated aquifer systems have been mapped in Jackson County: the Dissected Till and Residuum; the Alluvial, Lacustrine and Backwater Deposits; the Pre-Wisconsin Drift; the Buried Valley; the White River and Tributaries Outwash; and the White River and Tributaries Outwash Subsystem. Boundaries of these aquifer systems are commonly gradational, and individual aquifers may extend across aquifer system boundaries.

Most of Jackson County has been covered by pre-Wisconsin glacial sediments followed by further deposition of Wisconsin outwash, alluvial and lacustrine sediments. However, there are areas along the western third of the county and southeast of Brownstown where glacial materials are absent and only thin deposits of bedrock residuum overlie bedrock.

Thickness of sediments overlying bedrock ranges from 3 feet in areas where only residuum is present to as much as 130 feet where glacially-derived till, outwash, alluvial, and lacustrine deposits are present.

## **Dissected Till and Residuum Aquifer System**

The Dissected Till and Residuum Aquifer System covers areas along the western edge of Jackson County, areas to the south and east of Brownstown (Brownstown Hills), and upland areas where thin glacially-derived sediments overlie bedrock. It is the most limited ground-water resource of the unconsolidated aquifer systems.

Unconsolidated deposits of this aquifer system that lie beyond the pre-Wisconsin glacial limit consist predominantly of thin, eroded bedrock residuum. Thickness of these sediments typically ranges from 3 to 25 feet; however, some thicker deposits occur in areas near the White River where eolian sand deposits are present.

In upland areas within the limits of glaciation, the unconsolidated deposits of the Dissected Till and Residuum Aquifer System consist of pre-Wisconsin tills and deposits of Wisconsin age loess, alluvium, lacustrine silt and clay, and colluvium. Thickness of these sediments ranges from 5 to 54 feet but is commonly 10 to 30 feet. These areas may also include scattered intratill sand and gravel deposits up to 5 feet thick.

The Division has no record of drilled wells producing from this system. In areas where only residuum is present, there is little chance of completing a successful well. Drillers prefer to complete wells in the underlying bedrock. However, east of Crothersville a few

unlocated large diameter bored (bucket-rig) wells report capacities up to 8 gpm (gallons per minute).

Because of the low permeability of the surface materials, this system is not very susceptible to contamination from surface sources.

### **Alluvial, Lacustrine, and Backwater Deposits Aquifer System**

The Alluvial, Lacustrine, and Backwater Deposits Aquifer System is made up of heterogeneous bodies of alluvial, colluvial, and lacustrine materials within valley bottoms and terraces of some larger streams tributary to the East Fork White River.

Unconsolidated deposits within this system come from two sources. The first is alluvium deposited by streams along with colluvium eroded from valley walls and upland areas. The second source is glaciolacustrine deposits formed in bodies of relatively stagnant water. These deposits are attributed to the White River valley becoming choked with outwash from receding glaciers. The outwash deposits effectively dammed the tributary streams, thus creating lakes in which fine-grained glaciolacustrine deposits accumulated.

In Jackson County this system is mapped along a portion of the South Fork Salt Creek in the northwest part of the county, along selected portions of the East Fork Muscatatuck and Vernon Fork Muscatatuck Rivers in the east and southeast part of the county, and along small tributaries near the north central part of the county. Total thickness of unconsolidated materials overlying bedrock in this system is commonly less than 50 feet. Sand and gravel lenses, where present, are typically less than 5 feet thick and may be confined within the glaciolacustrine deposits or directly overlie bedrock.

This aquifer system is a limited resource and the Division has no record of wells actually producing from these deposits. The potential does exist, however, for completion of adequate domestic wells in some places where unconsolidated deposits are thicker than 25 feet. In many places large diameter bucket-rig wells could meet the needs of domestic use.

This aquifer system is generally marked by surface deposits of soft silt and clay that have a low susceptibility to surface contamination.

### **Pre-Wisconsin Drift Aquifer System**

The Pre-Wisconsin Drift Aquifer System is present along upland areas of the eastern two-thirds of Jackson County. In some counties this aquifer system is a limited resource, as evidenced by the lack of wells producing from the available unconsolidated deposits. However, in Jackson County thick glacial deposits having multiple sand and gravel units characterize this system. Where sand and gravel units are found, wells are completed in these deposits rather than the underlying bedrock.

Well depths in this system range from 19 to 104 feet but are typically from 30 to 60 feet. Potential aquifer materials include multiple, discontinuous intratill sand and gravel units. Surficial clay deposits overlying aquifer materials range in thickness from 1 to 75 feet but commonly range from 10 to 40 feet. Potential aquifer units are described by drillers as sequences of “sand,” “gravel,” “quicksand,” or “sand, gravel, and muck.” The individual reported units are quite variable in thickness. Some are as thin as one foot to as thick as 70 feet but are commonly 3 to 25 feet thick. In some areas the Pre-Wisconsin Drift Aquifer System includes an upper sand or gravel unit that in most cases drillers will bypass in favor of a lower unit. Thickness of the upper unit ranges from 1 to 25 feet. The multiple sands and gravels are separated by clay thickness that range from 5 to 50 feet.

Domestic well yields range from 2 to 45 gpm but are typically 5 to 15 gpm. In some isolated areas where outwash deposits are thicker this system may be able to meet the needs of high-capacity users. Static water levels range from 10 to 60 feet below land surface but are typically 10 to 35 feet below land surface.

The Pre-Wisconsin Drift Aquifer System is generally not very susceptible to surface contamination because its intratill sand and gravel units are overlain by thick till and lacustrine deposits.

### **Buried Valley Aquifer System**

The Buried Valley Aquifer System consists of aquifer materials deposited in pre-glacial bedrock valleys. During valley development, layers of bedrock were eroded to create valleys that were subsequently filled with unconsolidated sediment of variable thickness. Although there are additional buried bedrock valleys in Jackson County, only the larger buried valleys that contain significant water-bearing sediments have been included as mapped units of the Buried Valley Aquifer System.

There is one main buried bedrock valley system mapped in Jackson County. It includes an area that extends from approximately 2.5 miles south of Seymour and fans out to the south-southwest towards the Muscatatuck River. It cuts as deeply as 125 feet into rock of the Mississippian Borden Group.

Well depths range from 25 to 114 feet, but are typically 35 to 60 feet deep. Aquifer materials include multiple outwash deposits that vary in thickness. In some cases drillers report more than one outwash unit separated by clay materials that range from 4 to 20 feet thick. Upper outwash deposits range from 1 to 94 feet, but are typically 5 to 30 feet. Thickness of the lower outwash deposits ranges from 2 to 15 feet. Some well records also note clay underlying the lower outwash deposits. Most wells do not penetrate the full thickness of the aquifer system.

Domestic well yields range from 1 to 34 gpm but are typically 4 to 20 gpm. Static water levels range from 5 to 81 feet below surface but are typically 15 to 30 feet below surface. The Division has no records of high-capacity wells in this aquifer system. However, in some areas this aquifer system has sufficient thickness of sand and gravel to support high-capacity wells.

Because its intratill sand and gravel units are overlain by thick till and lacustrine deposits, the Buried Valley Aquifer System is generally not very susceptible to surface contamination.

### **White River and Tributaries Outwash Aquifer System**

The White River and Tributaries Outwash Aquifer System is located throughout portions of central and eastern Jackson County. This system contains large volumes of outwash and alluvial deposits that filled the main river valley of the East Fork White River. As the glaciers melted the quantity of sediment was too large for the streams to transport. As a result, the increased sediment load was stored in the valley as vertical and lateral accretionary deposits. As long as the retreating glaciers continued to provide sediment in quantities too large for the streams to transport, the main valley continued to be filled. These deposits formed the most prolific aquifer system in the county. Thickness of unconsolidated deposits overlying bedrock can be as much as 130 feet.

Aquifer materials include predominantly sand and gravel deposits that range from 6 to 96 feet thick but are more commonly from 20 to 60 feet thick. However, outwash areas mapped near the Muscatatuck and Vernon Fork Muscatatuck Rivers will include thinner aquifer deposits and more fine-grained sands and lacustrine sediments.

Well depths are typically 35 to 70 feet below surface. In some areas 6 to 15 feet of clay or silt overlie the aquifer materials. Static water levels range from 4 to 20 feet below surface but are typically 5 to 15 feet. Because the level of ground water is near the surface, most of the aquifer materials are saturated.

This system has the greatest potential of any aquifer system in Jackson County and can meet the needs of domestic and high-capacity users. Domestic yields range from 7 to 30 gpm. There are 25 registered high-capacity facilities (67 wells) in this system. Typical yields for high-capacity wells range from 100 to 1000 gpm.

In areas that lack overlying clays, this aquifer system is highly susceptible to contamination from surface sources. Where the aquifer system is overlain by clay or silt deposits, the aquifer is moderately susceptible to surface contamination.

### **White River and Tributaries Outwash Aquifer Subsystem**

The White River and Tributaries Outwash Aquifer Subsystem includes areas adjacent and parallel to the White River and Tributaries Outwash Aquifer System. This system typically occupies a higher topographic position than that of the outwash system and is marked by thinner outwash deposits overlain by sandy clay, clay, lacustrine, or eolian-derived loess and sand. These materials overlie aquifer deposits and range from 1 to 28 feet thick but are typically between 10 and 20 feet thick.

Total thickness of unconsolidated deposits overlying bedrock ranges from 27 to 130 feet. The thickness of aquifer materials within the unconsolidated deposits ranges from 1 to 74 feet but are typically between 10 and 35 feet. Well depths range from 12 to 114 feet below surface but are typically between 30 to 60 feet below surface. Many wells do not penetrate the full thickness of the aquifer system.

This aquifer system has the potential to meet the needs of domestic and some high-capacity users. There are three registered significant water withdrawal facilities (11 wells) that report yields ranging from 90 to 350 gpm. Domestic yields range from 5 to 20 gpm. Static water levels range from 5 to 30 feet below surface but are commonly between 10 and 25 feet below surface. In some well reports drillers refer to “wet” intervals suggesting saturated thickness that range from 2 to 27 feet.

Areas within this aquifer system that have overlying clay or silt deposits are moderately susceptible to surface contamination; whereas, areas that lack overlying clay or silt deposits are highly susceptible to contamination.

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